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ABSTRACT

This position paper discusses the magnitude of literacy problems in the United States, reviews the need for changes in teacher preparation, and provides recommendations for action. The first section of the paper addresses sources of difficulty for children who struggle with learning to read, including phoneme awareness, single word decoding, and related problems with verbal memory and language use. The paper also explores how intelligence and attention deficit disorders relate to reading disability, the characteristics of good readers, and why some children are better at acquiring reading skills than others. The next section provides a framework for the training requirements proposed in the final section. Recommendations include: (1) providing teachers with a solid understanding of the theoretical and scientific underpinnings of literacy development; (2) instructing teachers in the content of teaching, including the linguistic units of both speech and print; and (3) focusing more attention on helping prospective teachers acquire the complex skills of teaching, including experience with diverse learners. Training requirements are also proposed for other professions, including nursery school and kindergarten teachers, reading specialists and resource room/special education personnel, speech-language specialists, and school psychologists/diagnosticians. (Contains 78 references.) (CR)

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Informed Instruction for Reading Success: Foundations for Teacher Preparation

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A Position Paper of The International Dyslexia Association

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Informed Instruction for Reading Success: Foundations for Teacher Preparation

A Position Paper of
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Prepared by
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PREFACE

The International Dyslexia Association (IDA), formerly The Orton Dyslexia Society, founded in 1949, is an international, non-profit organization that concerns itself with the complex issues of reading acquisition and reading disabilities. IDA has a wide membership, including parents, practitioners, researchers, and individuals with dyslexia. Concepts serving as central principles guiding organization activities and publications include the following:

- Individuals deserve to reach their fullest potential in reading and writing abilities.
- The expertise and qualifications of teachers, together with effective instructional methods, are critical to helping children become successful readers and writers.
- Quality research on factors contributing to reading success and to reading failure should inform assessment and teaching practices.
- Information about important instructional and research developments should be disseminated to help promote well-supported practices in teacher preparation, in instructional methods, and in the prevention and treatment of reading difficulties.

The growing incidence of reading failure for children in the United States, the shortcomings of teacher preparation programs, and the lack of awareness of pertinent research prompted the IDA Board of Directors' Teacher Education Issues Committee to undertake this paper. The goals of the paper are to:

- Provide teachers and other professionals with information about an important body of knowledge and techniques currently available that would enable them to help children become successful readers.
- Dispel the myth that one does not need to know much to teach reading.
- Present an overview of exciting and relevant research gains that have clear implications for instruction.
- Describe an Informed Approach to Reading Instruction that would best serve all children and that is crucial for "at-risk" children and those with dyslexia.
- Identify the areas of knowledge teachers must have to provide Informed Instruction and make recommendations for changes in teacher preparation standards.
- Suggest steps that could be taken to bring about changes in teacher preparation.

INTRODUCTION

A sobering percentage of children in the United States encounters difficulty in reading; the personal and societal costs of these reading problems are enormous. Adding to the magnitude of the tragedy is the fact that it is unnecessary—the knowledge children need to master in order to succeed at reading is well-documented, and the kinds of instructional methods that are effective have also been verified. Despite this, most teachers are not being given the content and depth of training needed to enable them to provide appropriate instruction. Altering current practice in teacher training will require a fundamental change in how reading instruction commonly is viewed. In contrast to the erroneous and damaging belief that little preparation is necessary to be able to teach reading, we need to promote awareness that literacy instruction is a complicated task. The professional demands of teaching reading must be acknowledged, and, in turn, much-improved training opportunities must be available to prepare teachers better for the challenging task of teaching children to read.

Correcting the lack of adequate preparation for most teachers would be an important step toward reducing the reading problems facing this nation. A central goal of this paper is to specify foundations that we regard as essential for teacher preparation. In order for teachers to make informed decisions about how to work with individual children, they must have a conceptual foundation regarding reading acquisition and sources of reading difficulty. Their training should include information about how written language represents spoken language, about how language is structured, and about what is required for children to become skilled readers. In addition, it should include supervised practice using reading methods with a variety of learners. The content we advocate is not a return to the "phonics of old" or a sweeping rejection of techniques incorporated in "whole language" methods. Instead, with the preparation described, the focus shifts away from a broad endorsement of any single method, to an ability to analyze which component of reading to target at a particular time with which students, and, secondarily, which techniques would be most effective. Armed with this kind of conceptual knowledge, teachers would be genuinely empowered, knowing how to apprehend with insight how a child is progressing and what kinds of activities would be most helpful to promote growth in reading. With adequate pre-service training and in-service follow-up, the success rate for teachers in the kindergarten and early elementary grade classes could be markedly improved. Consequently, the demand for expensive intervention and remediation would be limited to the much smaller

Correcting the lack of adequate preparation for most teachers would be an important step toward reducing the reading problems facing this nation.

numbers of children with reading disabilities who truly require more concentrated instruction.*

Our recommendations are based on more than twenty years of convergent research studies on reading acquisition, reading disability, and reading instruction that have strong implications for how reading should be taught and for what classroom teachers need to know in order to be most effective at helping children learn to read. It is our belief that adequate preparation of classroom teachers, with corresponding adoption of an informed and balanced approach to reading instruction, would have a significant impact on literacy achievement in this country. It would also promote a shift from unnecessary extremes in reading instructional practices to reasoned collaboration.

In this paper, we briefly comment on the magnitude of literacy problems in the United States today, presenting some of the justification for the need for changes in teacher preparation.[1] Next, to provide a framework for the training requirements proposed in the final section of the paper, a summary of current research evidence and an overview of an informed approach to reading are provided.

WHY ARE CHANGES IN READING INSTRUCTION AND TEACHER PREPARATION NECESSARY?

Reading failure is epidemic. Declining test scores in reading have been noted in many states, most visibly in California, where the inability of children to read, spell, and write well has become a matter of widespread public concern. Elsewhere in the U.S., estimates from well-designed, recent studies suggest that by fourth grade, 20% of children are dysfunctional readers,[2] considerably more than are ever formally categorized as having a disability. The incidence of reading problems is markedly higher in many schools serving disadvantaged children.[3] Results from a 1994 national survey of reading achievement by fourth graders (National Assessment of Educational Progress) indicate that 44% of school children are reading below a basic level of achievement.** Of those identified as having learning disabilities, at least 80% have language-based reading problems.[4] Further, predictions for the coming decades are that the number of children with learning disabilities is on the rise for a variety of social, economic, and educational reasons.[5]

Although early intervention efforts with those at risk for reading problems are increasing, these can be very costly, involving ex-

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*Currently the needs of children with severe reading disabilities are not being met sufficiently as schools are overwhelmed with large numbers of non-dyslexic children who are also struggling to learn to read. We do not claim that improved teacher preparation will eliminate reading problems, but with an improvement in classroom success levels, it will be possible to direct the resources of specialists where they need to be.

**National Assessment of Educational Progress (NAEP), 1992 and 1994 Reading Assessments. "Below Basic" reading achievement is defined as follows: "This level identifies little or no mastery of knowledge and skills necessary to perform work at each grade level."

tended one-to-one instruction. Teacher re-education to implement these special programs currently costs upward of $6,800 per teacher,* and yet generally does not provide the scope of knowledge about reading acquisition that will be recommended below. Importantly, a significant number of children continue to have reading problems at the end of the "intervention,"[6] yet other support services for reading instruction may not be available.** At the same time, classroom teachers are being asked to provide instruction for students with a wider range of ability than ever before, and too frequently they have not received sufficient training regarding reading development and reading problems.[7] Parents, anxious about whether their children are learning how to read, are spending considerable sums on supplementary materials or on private instruction. Law suits against school systems for failing to provide appropriate educational programs for students have proliferated. Against all these sobering concerns, there is an area of real encouragement: impressive gains through national and international research efforts have highlighted what is essential for success at reading. As often happens in science, these gains have been slow to be translated into practice. Here we aim to share the findings and their implications for teacher preparation.

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WHAT HAVE WE LEARNED ABOUT LEARNING TO READ?

How Does Learning to Read Differ from Learning to Speak?

Speaking, listening, reading and writing are all language activities. A broad body of evidence indicates that the human capacity for the first two, speaking and listening, has a biological foundation: wherever there are people, there is spoken language; children learn to use their language with remarkable speed, regardless of wide variations in environmental circumstances and with negligible amounts of explicit instruction; human specialization for speech is reflected in a specially constructed vocal tract, in the organization of the brain, and in the perceptual sensitivity to speech sounds seen in

*Costs cited to train Reading Recovery specialists vary from program to program. For example, Bell (1995) in a California document reports, "Preparation of a fully trained Reading Recovery teachers' leader to work with an entire school district or consortium of school districts costs $14,610. Training of individual site-level teachers costs $6,820." A second training site, The Reading Recovery Program at Ohio State University, currently estimates the total five year expense of training a teacher leader to be $40,075 (not including salary during training and implementation years or the salary of a substitute to replace the person being trained during the training year). Of this sum, $23,094 is allocated to the first year of training at Ohio State to cover tuition, instructional fees, living expenses, and other fees.

**For example, funds for Title I programs are given to states depending on the state-wide incidence of poverty. Therefore, the amount going to individual states varies. Within states at the district level, local decisions are made about how these funds will be spent. Often Title I funds are used to support, or to partly support, Reading Recovery programs, and resources for other forms of assistance have been reduced.

very young infants.[8] Acquiring spoken language, or mastering the intricacy of the language system, is not a conscious activity. Children are focused on communicating, not on figuring out how to put speech sounds together to form words.

In contrast, writing systems are part invention and part discovery: on a relatively small number of occasions in history people have decided to create visual symbols (the invention) to represent elements recognized to be in spoken language (the discovery).[9] Some of the early writing systems were designed to have a symbol for each word or unit of meaning. This kind of system, known as a logography, is conceptually easy to understand, but presents the life-long task of learning thousands of symbols. For English we have instead a mixed system (referred to as morphophonemic) that uses symbols for individual speech sounds (i.e., phonemes*), as well as ones for units of meaning (i.e., morphemes:** for example the 'ing' at the end of the word wishing). The advantage of an alphabetic system such as English is that once one has mastered a fairly small number of sound-letter associations, the world of writing is accessible: new material can be read and explored without learning new visual symbols. The trade-off, however, is that the prerequisite discovery that words are composed of meaningless units of sound turns out to be remarkably difficult for many beginning readers to attain. For the fluent reader and writer this seems hard to believe, but twenty-five years of research corroborates that mastery of this insight is an impediment for approximately a third of the children in first grade and for those in later grades who continue to have difficulty learning to read.[10] Part of the reason phonemes are difficult for children to become aware of is that when humans say words, the phonemes overlap and influence each other so that the individual phonemes are difficult or impossible to produce in isolation. In addition, how phonemes are produced depends on the particular phonemes around them (e.g., the /t/ phonemes in take, little, and train differ).[11]

Unlike learning to speak a language, someone beginning to read and write has to discover, to appreciate consciously, what the symbols stand for in the particular writing system being learned.[12] The unnaturalness of written language, and the intellectual demands of learning to read, are one reason much of the world remains illiterate. Without instruction, learning to read and write are not part of the repertoire of human abilities.

*Phonemes constitute the smallest speech units that can change the meaning of a word (e.g., changing cat to bat), though they themselves are meaningless. The set of phonemes in English includes consonants (e.g., /b/, /d/), fricatives (e.g., /s/, /z/), vowels, and other phonemes. Though represented by the letters of the alphabet, phonemes and letters are not identical. For example, in English, some phonemes are spelled with two letters (e.g., 'sh' for the first sound in 'shout') and individual letters may represent multiple phonemes.

**Morphemes are the smallest meaningful units of language. These include free morphemes that may stand alone as words (e.g., the, black, bird) or that may be part of other words (e.g., blackbird, blackest), and bound morphemes that contribute to word meaning but are *not* words themselves (e.g., walk-*ed*, think-*ing*, *un*-learn-*able*, *con*-*struct*).

What are the Sources of Difficulty for Children Who Struggle with Learning to Read?

Phoneme Awareness. As indicated above, a major problem for children with reading problems is that they have not yet attained adequate awareness of the sound structure of words. That is, they have insufficient phoneme awareness to allow them to make sense of an alphabetic writing system. Complete awareness of the speech sounds in words typically develops over a number of years, beginning with appreciation of larger chunks of sound (i.e., phonological awareness) such as in rhyme (e.g., hand, band, and sand share a final sound unit "and"). This awareness gradually progresses to the individual speech sounds in words (i.e., phoneme awareness; e.g., sheep has three phonemes).[13] (We emphasize that *phoneme awareness and phonics do not mean the same thing.* Phoneme awareness refers to an understanding that words are made up of individual speech elements. The young child might attain a considerable degree of awareness of the phonemes in words before any knowledge of letters or letter-sound correspondences have been learned. Phonics refers to the latter concept, the representation of sounds with letters.) For phoneme awareness to develop, the child is helped by engaging in games and songs that focus on shared sound patterns (e.g., rhyme, alliteration) and later by taking part in verbal and literacy activities that direct attention to phonemes (e.g., "what is the last sound in dig?").* The role of phoneme awareness in learning to read has been supported by three outcomes: First, it is now recognized that kindergarten and first grade children who are behind in acquiring phoneme awareness are at risk for having difficulty learning to read. Second, older children and adults who are poor readers continue to have limited awareness of the sounds in words. And third, intervention and remedial strategies designed to foster phoneme awareness are successful at reducing the occurrence of reading disability.[14]

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Poor Single Word Decoding. A second hallmark of the person with low levels of literacy is poor word recognition skills. The decoding skills in the vast majority of impaired readers (and beginning readers) are slow and/or inaccurate.[15] As a result their eye movement patterns may be somewhat irregular for text they are having trouble reading (e.g., more regressions), but because this is a consequence of difficulty decoding rather than a cause, training eye movements per se will not improve reading ability.[16] Similarly, to compensate for limits in decoding ability, poor readers tend to rely more on context or on

*The relationship between learning about phonemes and developing decoding skills is reciprocal: Children have an easier time learning to read if they have awareness of phonemes and if instruction links these concepts of speech sounds with letter knowledge. At the same time, appreciation of the phonemic composition of words is enhanced by learning to read. (See Blachman [1994] for a review).

guessing strategies, though both are of limited value as text becomes less predictable.[17] Accordingly, measures of ability to read words and especially nonwords (e.g., pim) in isolation are crucial to recognizing a reading difficulty. It is important to appreciate, in light of the current interest in "authentic" assessment, that such measures are valid and realistic even though they may seem unnatural on the surface. By the mid-elementary years, it is estimated that a child annually encounters thousands of written words that have not been seen before.[18] The child's ability to analyze these new words quickly and accurately affects whether that child is able to "read to learn."

Unfortunately, poor decoding skill in the early grades is highly correlated with limited comprehension and decoding in the later grades: reading problems usually persist.[19] Without direct instruction of the right kind, the child encountering difficulty does not catch up in decoding skill. The common assumption that reading problems in older individuals stem entirely from difficulties in comprehension, that decoding problems are only a stumbling block in the early grades, has been demonstrated to be false. Most older poor readers continue to have weak phoneme awareness and inaccurate and slow decoding skills.[20] Their difficulties may be particularly evident in incorrect spelling of morphemes and words.[21]

Unfortunately, poor decoding skill in the early grades is highly correlated with limited comprehension and decoding in the later grades . . .

Related Problems with Verbal Memory and Language Use. A number of less focal phonological weaknesses also have been found to be associated with reading disability. Poor readers often have a shorter verbal memory span; they have difficulties with word retrieval (i.e., they "know" the word, but may not be able to retrieve the accurate way to pronounce the word); and they seem to require more practice to retain the pronunciation of new vocabulary items.[22] These phonological difficulties in turn may impede listening or reading comprehension,[23] and may contribute to the impoverished use of sentence structure in spoken language typical of many children who are poor readers.[24]

How Do Intelligence and Attention Deficit Disorder Relate to Reading Disability?

Reading problems affect people of all levels of intelligence. That is, the person with a reading disability may be brilliant, average, or low in intellectual capacity, and may or may not have complementary talents in other skills such as art, music, athletics, or mathematical reasoning. At the same time, performance on some tasks included on achievement and intelligence assessment batteries (e.g., vocabulary knowledge) may be affected as a result of both the phonological deficits and the reduced exposure to written material experienced by individuals with reading problems. Yet, regardless of intellectual level or other possible areas of proficiency, individuals with reading problems have in common a difficulty with the

phonological demands of reading (i.e., phoneme awareness, decoding, and spelling). Those who are lower in intelligence often have additional problems with reading and language comprehension. The core pattern of phonologically based reading problems, present at all levels of intellectual ability, raises concerns about the prevailing use of discrepancy scores between reading and aptitude measures to identify which children are to receive reading assistance.*[25]

Just as research has confirmed the relative independence of intelligence and reading ability, recent studies indicate that attention deficit hyperactivity disorder (ADHD) and reading disability are separate problems.[26] Children who happen to have both ADHD and a reading impairment (approximately 33% of those with learning disabilities) show the phonological weaknesses characteristic of dyslexics. (The fact that more boys are noticed by educators as having reading problems may be related to the higher incidence of ADHD in boys.) In contrast, those individuals with ADHD who are normal readers do not have phonological deficits.[27]

What are Good Readers Good At?

The good reader excels at word identification, and is able to read either new words or isolated words accurately and quickly. This automaticity creates the impression of the reader making a direct psychological link between whole words and their meaning without having to analyze words. However, research confirms instead that the skilled reader rapidly and effortlessly translates written words into their spoken equivalents.[28] Central to the reader's expertise is an appreciation of the phonemic structure of words. Skilled readers perform well on listening tasks requiring the identification or manipulation of the sounds in words (e.g., what is "smile" without the "s"). As phoneme awareness and good word reading skills develop, the reader is increasingly able to reflect on the meaning and structure of the text. Thus the better reader also tends to be superior at reading comprehension, at awareness of the communicative functions of text, and at knowledge of comprehension strategies.

Research has established that good readers do not skip over significant numbers of words: studies of eye movements document that skilled readers fixate on most of the words of a text.[29] The occasional skipped words tend to be very short and predictable (examples: the, and, of, to). Further, the fact that good readers can identify words, even new ones, virtually as well when they are presented in isolation as when in connected text underscores that their fluency does not depend on better guessing or prediction skills.[30]

*Currently, children who qualify for assistance must demonstrate a marked discrepancy between reading performance and general aptitude, despite the fact that the nature of their reading deficits often cannot be distinguished from those of others who do not meet the required discrepancy. Two factors add to the difficulty children with reading disabilities may face: Because phonological problems may impede performance on some components of aptitude testing, a child may not obtain the necessary discrepancy score. Similarly, because of environmental influences on aptitude performance (e.g., on vocabulary knowledge), socially disadvantaged children with reading difficulties may not qualify for reading assistance.

Why are Some Children Better at These Skills than Others?

Genetic Predisposition. Part of the explanation for individual variation in reading success is genetic.[31] The language abilities centrally related to reading development have a biological basis and appear to be normally distributed in the population. In other words, a bell-shaped curve represents the distribution. Those individuals at the end representing higher phonological abilities find it easier to learn how to read, almost regardless of the type of instruction they receive.[32] Those at the low end, who are characterized as having dyslexia, require a systematic, explicit method of reading instruction.[33] Lacking this they are not likely to become proficient at phoneme awareness and decoding.* The cut-off point on the distribution for the label 'dyslexic' is an arbitrary decision. Nonetheless, wherever they fall in the distribution of language skills, most children find it easier and faster to learn to read and spell if they are given systematic instruction.[34] A key point is that with optimal classroom instruction we can reduce the percentage of children who will need special assistance in learning to read.

Environmental Factors. A second factor affecting ease in learning to read appears to be environmental. Early childhood activities such as songs and word games (e.g., rhyming) enhance awareness of the sounds in words and help the child move toward a full appreciation of the phonemic composition of words. Families, as well as preschool and kindergarten programs,[35] that deliberately incorporate such activities increase the likelihood of reading success by children. Building enthusiasm for books, appreciation of text structure, and vocabulary knowledge are also important, but less centrally related to acquiring the necessary skills for early reading success.** Children from disadvantaged backgrounds, known to be at-risk for reading failure, tend to enter school significantly behind their age-mates in phonological awareness, in knowledge of the alphabet, and in vocabulary.[36]

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Instructional Issues. A further aspect of the environment concerns the nature of reading instruction provided. Particularly for those children who have weak phonological abilities or impoverished lan-

*It is important to note that a genetic and biological basis for a deficit does not mean that it cannot be remedied, but does suggest that theoretically grounded instruction is necessary to remedy or accommodate the deficit.

**See Scarborough & Dobrich (1994) for a review of the effects of reading to children on their subsequent reading achievement. (Positive benefits of reading to children were documented on vocabulary knowledge and on knowledge of the world, confirming the widespread conclusion that reading to children is beneficial in numerous ways. Nonetheless, only a weak relationship was evident between reading to children and their success at learning to read per se.) See Juel, Griffith, & Gough (1986) for an example of the weak association found between vocabulary knowledge and beginning reading skills, though see Share & Stanovich (1995) for consideration of the value of vocabulary knowledge as decoding skills progress.

guage experience, failure to provide appropriate instruction can exacerbate their reading difficulties.[37] Ideally, the fit between instruction and the child's point in literacy acquisition should be well matched. Within each component of literacy development, including phoneme awareness, reading, spelling, and writing, development occurs in a fairly predictable progression, and success in each area is related to the others. For example, phonetic spelling and the beginning use of phonics in word reading are dependent upon children being able to segment the individual speech sounds in the spoken word.[38] Children learn best when instruction corresponds to their current reading level, and may not learn well if the instruction is not attuned to their stage in learning to read. For example, phonics instruction might not work for children who cannot segment the phonemes in words. This does not mean that children will learn better if direct instruction is delayed until children seem to be "ready";* instead, most children, including those at risk for failure, can benefit from direct instruction that is developmentally appropriate and that targets specific skills directly.[39] Similarly, training phoneme awareness but failing to help children progress to more advanced levels of reading is not enough: it is now clear that phoneme awareness is necessary, but not sufficient for becoming a reader.[40]

AN INFORMED APPROACH TO READING INSTRUCTION

The areas of strengths for skilled readers and of weaknesses for children having trouble learning to read cover a broad range of language and reading abilities. Not surprisingly, the kind of instruction necessary to foster reading success must also address a variety of goals. Two general principles guide our recommendations regarding reading instruction. First, both research results and teaching practice indicate that children profit from instruction in reading that is explicit, systematic, and sequential.** Learning why words are spelled or pronounced the way they are, as well as what the words mean, is crucial for those children having difficulty learning the English alphabetic system and is beneficial for all. Second, at the same time, effective instruction is active and engaging, emphasizes discovery and understanding, and is aided by frequent oppor-

. . . both research results and teaching practice indicate that children profit from instruction in reading that is explicit, systematic, and sequential.

*Even adults who have not had the opportunity for instruction (e.g., in rural areas without schools) are lacking in awareness of phonemes (e.g., Lukatela, Carello, Shankweiler, & Liberman, 1995), underscoring that such skills do not develop "naturally" as an outcome of "maturation".

**Within each component of literacy instruction, it is important to teach easier, foundation concepts before more advanced constructs. However, the recommendation for sequential instruction should not be taken to mean either a lockstep progression within each area of skill or that one must complete instruction in one area (e.g., decoding) before beginning instruction in another (e.g., comprehension strategies). Later in this paper we discuss the benefits of interweaving the elements of literacy instruction.

tunities to practice spelling, writing, and reading skills in meaningful contexts. Though these two principles are often pitted as extreme alternatives, they need not be. We describe the combination of methods as an "Informed Approach" to reading instruction.[41]

Some of the central components of such an approach will be briefly outlined. First, as noted earlier, a key requirement for becoming a skilled reader is that the child needs to discover that words are composed of meaningless sounds and to learn to identify these sounds. Phonological sensitivity typically arises first for rhymes and for the beginning sounds in words (i.e., phonological awareness). Gradually the child attends to the sounds at the ends of words and, eventually to the middle sounds as well, developing awareness of individual phonemes at all positions within spoken words (i.e., phoneme awareness). Internal analysis of clusters of consonants (e.g., 'str' in straw and 'lk' in silk) is particularly difficult and may not be mastered for several years. Teachers need to organize lessons to foster phoneme awareness with this developmental sequence in mind and to systematically continue such activities as the child's phonemic awareness advances. The occasional rhyming activity and naming of items that start with a particular letter are not sufficient.

. . . effective instruction is active and engaging, emphasizes discovery and understanding, and is aided by frequent opportunities to practice spelling, writing, and reading in meaningful contexts.

Equipped with a sharpened sensitivity to the individual sounds in words, the child has a conceptual framework for understanding the nature of an alphabetic writing system. (Without it, both phonics and whole language approaches to reading instruction may be baffling.) A necessary step is to link knowledge of the speech sounds (i.e., phonemes) with their corresponding letter patterns (i.e., both graphemes and spelling patterns). In practice, the child usually begins to do this before a complete awareness of the speech sounds in words is attained. To acquire early decoding ability, children will benefit from systematic instruction that highlights regular patterns in written English and from reading stories with words selected that enable them to practice their decoding knowledge. We emphasize that learning to read will be aided by frequent opportunities to practice spelling and reading skills, with reading for meaning being an important component. As the reading skills progress, the need for decoding instruction shifts to more sophisticated spelling patterns and on how to recognize the main syllable patterns in English. The all-too-frequent practice of teaching a minimal amount of decoding in first and second grade and then discontinuing any focus on the structure of words leaves too many children without sufficient guidance. Skillful decoding and spelling will be facilitated by ongoing instruction about how words are formed. Activities targeting the meaning units in words (i.e., morphemes) can both increase a child's understanding of the meaning of words and the child's ability to spell the numerous words composed of these morphemes. (For example, encouraging

children to figure out what the meaning of 'struct' is in 'construct', 'destruction', 'instructor', (and other words they recall containing 'struct'), leads to the illuminating discovery that it means "to build" and a heightened appreciation of the meaning of words with this root. Likewise, ability to spell the large assortment of words containing 'struct' is also enhanced by this straightforward type of exercise.)

In addition to the emphasis on decoding the sound structure of words, a good teaching program will encompass comprehension and writing skills.[42] Innovations in early writing activities have demonstrated the satisfaction children gain from writing and publishing their own stories from the earliest school experiences onward. Advances in instruction on the organization and style of text (e.g., semantic webbing, analysis of genre) and in the value of writing as a tool for thought have contributed to a shift in many schools from a focus on "skills" to an emphasis on "meaning and authenticity." We advise that both sound analysis and attention to meaning should be included from the outset. That is, the identification of elements of skilled reading (e.g., phoneme awareness, decoding, morphology, and comprehension) should not be equated either with a strictly sequential approach among these components, or with rote learning. Rather, the introduction of strategies for enhancing a child's thinking and comprehension also should begin early as coordinated strands of literacy development. From the start children should be "reading for meaning," and early school experiences should range from children generating their own stories to creating a semantic web for a more complicated story read by the teacher. In other words, the various elements of advanced literacy will be fostered by numerous different activities at each level of reading development, and interweaving of activities is inevitable and desirable. For example, the skilled teacher should be able to interpret the spelling errors produced during a writing activity, recognizing what kind of feedback or guidance about phoneme awareness would be instructive. Similarly, written text with run-on sentences or sentences without a verb would provide an opportunity for helping the child to think about the syntax of sentences. While reading a story out loud to the class, the teacher could briefly digress to ask the class what a word with a particular morpheme might mean.

. . . a good teaching program will encompass comprehension and writing skills.

Providing this kind of insightful, flexible, and informed instruction requires that teachers themselves receive systematic training about the conceptual requirements of becoming a reader, about the structure of spoken and written language, and about a variety of activities that would enable and augment the development of literacy. In short, teaching children to read is a task for an expert, and teacher preparation needs to be comprehensive enough to create such experts.

WHAT DO TEACHERS NEED TO KNOW TO BE EFFECTIVE TEACHERS OF READING?

A Proposed Foundation

From the discussion thus far, it is evident that several areas of expertise are requisite for informed teaching. Below we describe three elements of training that we believe constitute the core of information and experience needed for skillful reading instruction. A complete curriculum for teacher preparation in reading would include additional valuable courses on teaching writing, on children's literature, on multicultural issues, and on other topics pertinent to literacy. Here we aim merely to delineate the central concepts and skills necessary to enable teachers to fulfill their mission to help children become successful readers.

Recommended Core Requirements:

1. Conceptual Foundations—The Reading Process: *Teachers must be provided with a solid foundation regarding the theoretical and scientific underpinnings for understanding literacy development.* This should include knowledge of the relationship between spoken and written language, covering the basics of language organization and an overview of the historical evolution of English. A comparison of the English writing system with the writing systems of other languages of the world helps highlight what the cognitive requirements are for a child learning to read English.

In addition, teachers must be trained to have a sophisticated understanding of *the development of phonological awareness and of the process of learning to read.* They need to know how children progress from a lack of awareness about the sound structure of language to a full appreciation of the speech sounds in words. Correspondingly, they should have knowledge of the steps involved in going from a non-reader with no concepts regarding print, to initial strategies employed by beginning readers, to the sophisticated abilities of skilled readers.[43] Teachers need to learn about the importance of automaticity in decoding, of vocabulary concepts, of knowledge of text structures, and of comprehension strategies. *They need to understand what constitutes adequate research evidence, to be well versed about the research regarding sources of difficulty for individuals who are having trouble learning to read, and to know what strengths are central to skilled reading.*

Such a foundation would provide a teacher with the necessary framework for being able to assess a child's progress in learning to read and to make informed decisions about the relevance of specific teaching techniques. As an additional benefit, the teacher would be better prepared to critique future claims about reading acquisition, reading failure, or "new" methods of instruction.

2. Knowledge of the Structure of Language: In order to teach reading, writing, and spelling, *teachers need to understand thoroughly the content of instruction—the linguistic units of both speech and print.* Teachers must have an introduction to concepts of phonetics, phonology, phonics, morphology, syntax, text structure, and pragmatics. This knowledge of linguistic units should be connected with the broader framework noted above. The training also should seek throughout to apply the content to interpreting student errors in reading and writing, giving corrective feedback, designing instructional activities, and critiquing existing instructional materials.

We propose that teachers need to receive training on these topics for two reasons. First, as discussed earlier, children have to become aware of the elements of language as they endeavor to discover how print represents speech and how to write and comprehend the language of text. Hence, to apprehend where a child is in that process, and to respond to the child appropriately, the teacher should have a working knowledge of the units and rules of spoken and written English. Such knowledge would enable the teacher to interpret the basis for particular kinds of reading, spelling, or writing errors and to provide the most effective input or guidance. Second, recent studies suggest that *adults usually do not know about language structure with the detail and specificity that would be required to teach it.*[44] The teacher, as a skilled adult reader, reads and writes automatically and with little conscious awareness of the structure of words or sentences. To help children make the necessary discoveries, to impart linguistic concepts with clarity, with appropriate examples, and with systematic coverage, teachers need to be more knowledgeable than the typical educated adult and this requires instruction on the structure of language. A Language Study course should include the following:

. . . teachers need to be more knowledgeable than the typical educated adult and this requires instruction on the structure of language.

A. Knowledge of the English Speech Sound System and its Production (Phonetics and Phonology). Teachers should learn to identify, produce, classify, and manipulate the speech sounds in English so that effective instruction in phoneme awareness, phonics, and word structure is possible. Misconceptions about the phonemes in spoken words often have to be corrected to help adults understand accurately the correspondence between phonemes in speech and in written form.

B. Knowledge of the Structure of English Orthography and its Relationship to Sounds and Meaning (Phonics and Morphology). As noted earlier, in an alphabetic writing system such as English, print more or less represents individual sound units of the language (phonemes) as well as the meaningful parts of words (morphemes). Our writing system, or orthography, is more predictable and pattern based than is sometimes believed. About 87% of English spelling is based on sound-spelling correspondence patterns and rules, including regular spellings for morphemes.[45] Therefore, the

writing system lends itself to orderly, systematic instruction. This is valuable for the majority of students, enhancing both reading and spelling performance, and is critical for those who do not perceive intuitively redundant patterns and connections between speech and print. Only a small percentage of words must be learned by rote or by sight because they have unique sound spelling associations.

Teachers should acquire knowledge of phoneme-grapheme correspondence (phonics) and of spelling generalizations and rules. Not only should they learn the letter-sound correspondences adequate for one syllable regular words, but additional strategies should be acquired for decoding (and spelling) multisyllabic words found in textbooks and literature beyond the second grade. Teachers need to know the major patterns for dividing words into their syllables. In addition, they will benefit from learning the most frequent morpheme patterns, the meaning units found in compound words, prefixes, roots, and suffixes.[46] By learning the common affixes (prefixes and suffixes) along with common Latin and Greek word roots, teachers (and thus their students) would have the keys to tens of thousands of words. (For example, strategies for decoding and understanding are gained by recognizing the morphemes in words such as *overwhelming*, *reconstruction*, and *microscope*.)

C. Knowledge of Grammatical Structure (Syntax, Text Structure). An introductory knowledge of syntax or sentence structure should also be attained. As noted earlier, impoverished use of sentence structure is typical of many children who are poor readers, and the teacher needs to be able to evaluate syntax difficulties and provide helpful feedback. Accordingly, teachers should be able to: explain principles of grammar; construct compound, simple, and complex sentences using various diagramming and modeling strategies; identify sentence transformations; identify paragraph, narrative, and expository text structure and use visual representations of language structure.

3. Supervised Practice in Teaching Reading: Much more attention needs to be focused on helping prospective teachers acquire the complex skill of teaching. We recommend that training in teaching include supervised experience with one-to-one instruction and with larger groups so that teachers' assessment* and instructional skills can be honed.** Because teachers will encounter children at a variety of ages, levels of proficiency, and individual strengths and weaknesses, *experience should be gained with di-*

*By assessment, we mean that the teacher will be able to infer from a child's handwriting, reading, spelling, and writing performance what areas need to be addressed with instructional activities.

**The importance of supervised practice also is recommended by Morris (1992), author of a tutoring manual designed to educate first grade teachers in how to instruct at-risk students. To meet the goal of supervised practice it will be crucial to select practice teaching sites carefully; the current widespread gaps in knowledge by professionals mean that care must be taken to locate well-trained teachers to serve as mentors.

verse learners and should include multiple observations of peer models at work. Complementing the components of structured language teaching itemized above, *teachers need to practice translating their knowledge of language and of how children learn to read into relevant activities* both for individual children and for classes (see Appendix A for an itemized list of skills to be practiced). They must be prepared to use numerous different activities at each level of reading development while preserving the intent to provide a balanced, comprehensive, and focused program. *Supervised practice should include opportunities to team teach, consult with a mentor, and participate in problem-solving dialogues with fellow professionals.* As we have stressed, teaching children to read is a job for an expert, and novices need a great deal of support and guidance.

. . . teachers need to practice translating their knowledge of how children learn into relevant activities . . .

A noteworthy benefit of this kind of preparation is that the individual will learn to distinguish between what constitutes real knowledge, backed by sufficient evidence, and what is merely a belief. In the classroom a teacher thus trained would be able to explain what she is teaching, how she is teaching it, and why. These apparently simple accomplishments in fact reflect keen knowledge of reading acquisition and of instructional procedures. One of the questions sometimes raised about what we advocate in this document is whether it is merely today's fad, to be swept away in years to come. The reason we can answer with confidence that this is not simply the latest trend, and that the information rests on a solid foundation, comes back to the research base emphasized throughout this paper: substantial inroads have been made regarding what is necessary for a child to learn to read and to become proficient. The central claims reported here have been evaluated critically in numerous careful research studies that converge on a set of conclusions.[47] No doubt additional information will be gained in future research. However, this will expand, not eradicate, the knowledge base about reading development, reading disability, and reading instruction. Acquiring the conceptual foundation stressed here will enable the future teacher to evaluate critically the merit of subsequent claims and to incorporate well-supported future findings into an existing framework. Building these skills for educators should help to protect educational practice from unjustified swings of the pendulum and might help avoid the counter-productive schism between research and practice that has too often prevailed. Indeed, one would expect teachers, like other professionals such as doctors and lawyers, to keep abreast of new developments.

The three elements described above (i.e., conceptual foundation, knowledge of the structure of language, and supervised practice) can be designed as separate courses or can be run in tandem as a training sequence with a practicum component. The latter might be preferable for pre-service training with future teachers who lack familiarity with the characteristics of beginning and ad-

vanced readers. However, regardless of the format selected, *it is essential that sufficient time be given for teachers to grasp and master the content and skills* presented here (i.e., a minimum of a year-long training course). The material in the recommended core requirements is abstract and complicated: it takes time and practice to be mastered. Ideally, a pre-service program should provide coursework directly linked to competency standards that would then be practiced and evaluated in an induction program during the teacher's first two years of teaching. In-service experiences that were part of a coherent long-term plan for professional development would continue the growth process. Such continuity between the pre-service training and the nature of the instructional methods adopted in the school setting critically influences whether new teachers solidify and fully master the methods recommended in the training program. The implication, of course, is that designing the optimal training experience should entail closer collaboration between trainers and schools than generally occurs.

TRAINING REQUIREMENTS FOR OTHER PROFESSIONALS

Because reading instruction continues over several years, and may involve specialized personnel if a child is encountering difficulty in language and/or reading, we recommend *the need for a common vocabulary and conceptual foundation among school personnel.* That is, rather than perpetuating the fragmentation of services that children so often encounter, as well as the confusion of conflicting recommendations from different staff members, we believe that *continuity in treatment is highly preferable.* If the teacher could accurately report the areas of weakness for a given child to specialists, commenting on the techniques that have been tried, the specialist could determine more quickly what further methods were warranted. Conversely, if a child were benefiting from the instructional techniques of a specialist, those gains are far more likely to be maintained and extended when the child returns to the classroom for literacy instruction if the classroom teacher understands what kind of feedback, choice of reading material, and activities are optimal. Here we briefly comment on those professionals, in addition to the elementary classroom teacher, whose role in emergent literacy, in diagnosis of reading difficulties, or in reading remediation indicates that they too require familiarity with the concepts outlined for regular teachers.

. . . we recommend the need for a common vocabulary and conceptual foundation among school personnel.

Nursery School and Kindergarten Teachers

In addition to stimulating oral expressive language, language comprehension, and print awareness, nursery school and kindergarten teachers should know how best to foster phonological awareness and to link recognition of sounds with letters. Teachers of young children should know how to identify the language problems of children at risk for reading difficulty.

Reading Specialists, Resource Room/Special Education Personnel

These personnel need in-depth knowledge and training in the topics recommended here for the classroom teacher. Because these specialists are likely to be working with children with more severe reading problems, they need to know how to pinpoint specific areas of weakness in reading performance for children experiencing difficulty learning to read. They must have expertise in effective remedial strategies targeting structured language methods that have been developed to address the needs of children with reading disabilities.[48]

Speech-Language Specialists

Speech-language specialists should know how to assess the phonological abilities of children and other aspects of the structure of language relevant to reading and writing. Expertise in techniques that employ guided discovery of how phonemes are articulated[49] is a valuable skill for enhancing phoneme awareness in children who are not benefiting from strictly auditory activities.

School Psychologists/Diagnosticians

The school psychologist or diagnostician needs to know how to distinguish reading disability from other learning disabilities and how to differentiate difficulties in phoneme awareness and decoding from comprehension problems.[50] Ability to make informed diagnoses and recommendations for treatment of reading disabilities also requires an understanding of the research on the cognitive and linguistic correlates of reading problems, and knowledge of the kinds of errors children make at different points in the development of literacy.

CLOSING REMARKS

The large number of children experiencing difficulty learning to read in this country is a worrisome reality. Teachers and other professionals face a serious responsibility to help children become successful readers, but at the present they are not being given an important body of knowledge and techniques currently available that would help them accomplish this task. Although nearly three decades of systematic research has converged on clear indications about what children need to know in order to become good readers, this domain of knowledge has not yet filtered through to most Schools of Education. The majority of teachers trained are not being provided with a conceptual foundation, with knowledge about the structure of spoken and written language, or with the practical methods and hands-on experience necessary to enable them to fully meet the needs of children learning to read.

. . . we will need to overcome the too-common misperception that minimal preparation is necessary to teach children to read.

Remedying this situation is a complex challenge. To move toward that goal we will need to increase awareness that at least some of the important factors contributing

to the reading crisis could be corrected, and we will need to overcome the too-common misperception that minimal preparation is necessary to teach children to read. State Departments of Education should be urged to mandate sufficient training for certification requirements and to demand that University training programs update and modify their offerings to provide adequate teacher preparation. However, one of the serious roadblocks in alleviating the current shortcomings is that the University faculty necessary to provide this training is not now in place: most of the educators providing teacher training themselves need to be re-educated in the areas reviewed here. Thus, it will be necessary to confront the resistance to change that will no doubt occur and to structure the guidelines for course content sufficiently that "token" instruction on the topics outlined will not take place.* Federal agencies could be petitioned to help provide funding for the retraining that will be necessary at the University level and to sponsor model training programs. The solutions to bringing about the changes called for in the educational establishment will require numerous widespread efforts and awareness campaigns. This is a daunting task, but two facts mandate that we take on the challenge. First, the huge number of children encountering reading failure, and the grievous toll for them, their families, and society, is unacceptable. Second, most of these reading problems are avoidable: with adequate teacher preparation our schools would be able to meet their obligation to teach children to read.

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*See Blachman (in press) for discussion of the dangers of oversimplification and misunderstanding inherent in the popularization of the concept of phoneme awareness.

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APPENDIX A

Supervised practice in teaching reading should include opportunities to:

A. *Become proficient in fostering phoneme awareness* through organized games and informal activities. Activities should be planned and executed with respect to a developmental continuum.

B. *Know ways to teach letter name and shape recognition and the writing of letters* using an explicit, standard letter formation system.

C. *Gain a working knowledge of ways to introduce regular sound-symbol patterns, letter clusters, and syllable types*, including demonstrating proficiency in representing all of the 44 speech sounds of English.

D. Be able to teach the *formation of letter shapes for handwriting*, both manuscript and cursive, to be integrated with the teaching of reading and spelling.

E. Be able to *select appropriate reading material*, both stories incorporating phonic patterns and other literature, for various levels of reading acquisition.

F. *Become familiar with methods for teaching morpheme analysis and spelling.*

G. Engage their students in activities to *promote knowledge of word meanings and vocabulary development.*

H. Teach the *orthographic conventions of spelling regular and rule-based words.*

I. Be able to *foster comprehension* using validated techniques such as semantic webbing, reciprocal teaching, and analysis of genre (narration, exposition, poetic writing). Stimulation of a child's comprehension abilities should be part of literacy instruction from the beginning.

J. Teach *writing skills* helping students construct sentences, paragraphs, and longer compositions, using writing as a tool for thought.

K. Demonstrate knowledge of and the practical application of

positive, active, and *systematic teaching techniques*, using review and practice of what has been taught directly, discovery learning, and teaching to mastery.

L. Exhibit practical knowledge of *how to assess children's reading abilities*, and of *appropriate lesson planning* to cover each of the items listed above.

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FOOTNOTES

[1]For a broad review of the need for improved teacher preparation see "What Matters Most: Teaching for America's Future," a 1996 report from The National Commission on Teaching & America's Future.

[2]Based on an observation of a normal distribution of word recognition ability, results from the Connecticut Longitudinal Studies (Shaywitz, Escobar, Shaywitz, Fletcher, & Makuch, 1992) have estimated consistently that those below the 20th percentile in word recognition have significant functional reading difficulty.

[3]e.g., Kozol, 1991; Snow, Barnes, Chandler, Goodman, & Hemphill, 1991.

[4]In meta-analyses of research studies on learning disabilities (e.g., Kavale & Forness, 1985), and in studies sponsored by the National Institutes of Health research program in learning disorders (Lyon, 1995a), 80% to 85% are disabled primarily in reading. See also Lyon (1995b).

[5]Papers citing statistics on the social and economic consequences of learning disorders are collected in a volume edited by Cramer & Ellis (1996).

[6]Shanahan & Barr, 1995.

[7]See Moats (1994) and Lyon, Vaasen, & Toomey (1989) for evidence that teachers feel underprepared to meet the needs of diverse learners in their classrooms. See Moats & Lyon (1996) for further discussion of the need for adequately prepared teachers.

[8]Pinker, 1994.

[9]Gleitman & Rozin, 1977.

[10]Many excellent reviews of this literature exist. We recommend Adams (1990); Adams & Bruck (1995); Brady & Shankweiler (1991); Gough, Ehri, & Treiman (1992); and Rack, Hulme, Snowling, & Wightman (1994).

[11]Miller, 1990.

[12]Liberman, 1992.

[13]See Brady, Fowler, Stone, & Winbury (1994) for further discussion of the distinction between phonological and phonemic awareness, and of instructional techniques to foster each.

[14]In addition to the sources cited in footnotes 17, 19 and 20, for recent discussions of these points see Byrne & Fielding-Barnsley (1995), Foorman, Francis, Beeler, Winikates, & Fletcher (1997), Olson, Wise, Ring, & Johnson (in press), Torgesen (1997), and Vellutino et al. (1996).

[15]See Rack, Snowling, & Olson (1992) for a review of the occurrence of decoding problems in poor readers. See Samuels, Schermer, & Reinking (1992) for consideration of how decoding becomes automatic and Perfetti (1985) for discussion regarding the role of automatic decoding skills in comprehension of text.

[16]Rayner, 1985.

[17]Gough, 1983; Perfetti, 1985; Stanovich, 1992.

[18]Nagy, Herman, & Anderson, 1985.

[19]e.g., Beck & Juel, 1995; Lyon, 1995b.

[20]e.g., Bruck, 1990; Shankweiler, Lundquist, Dreyer, & Dickinson, (in press). See Fowler & Scarborough (1993) for a review of the literature on reading problems in adults.

[21]e.g., Henry, 1988; Moats, 1995.

[22]e.g., Aguiâr & Brady, 1991; Brady, 1991; Scanlon & Vellutino, (in press).

[23]See Perfetti (1985) and Shankweiler (1989) for discussion.

[24]See Kamhi & Catts (1989), Perfetti (1985), and Shankweiler, Crain, Brady, & Macaruso (1992).

[25]e.g., Fletcher et al., 1994; Pennington, Gilger, Olson, & DeFries, 1992; Shaywitz, Fletcher, Holahan, & Shaywitz, 1992; Stanovich, 1992. See Lyon (1995b) for a review.

[26]See Pennington (1991) for a review.

[27]e.g., Shankweiler et al., 1995; Shaywitz, Fletcher, & Shaywitz, 1994.

[28]e.g., Share & Stanovich, 1995. See Van Orden, Pennington, & Stone (1990) for a review of the research rejecting the existence of a direct, non-phonological means of word recognition.

[29]e.g., Rayner & Pollatsek, 1989.

[30]See Adams (1990) for a review of research on the strengths of good readers.

[31]See Pennington (1991) for a review of research on the heritability of reading problems using twin and adoption studies and of investigations of gene locations affecting dyslexia.

[32]e.g., Beck & Juel, 1995.

[33]e.g., Torgesen, 1997.

[34]See Adams & Bruck (1995) and Beck & Juel (1995) for reviews.

[35]e.g., Rubin & Eberhardt,1996; see Blachman (1994) for a review.

[36]Baydar, Brooks-Gunn, & Furstenberg, 1993; Bowey, 1995; Brady et al., 1994; Foorman, Francis, Beeler, Winikates, & Fletcher, 1997; Robertson, 1997.

[37]e.g., Felton, 1993; Foorman et al., in press.

[38]e.g., Rubin & Eberhardt, 1996; Byrne & Fielding-Barnsley, 1995.

[39]e.g., Blachman, 1994; Cunningham, 1990.

[40]e.g., Byrne & Fielding-Barnsley, 1995.

[41]See Bowler & Ellis (1987), Ellis (1991), Honig (1996), and a collection of articles in *Readings for Educators* (an Orton Dyslexia Society publication) for additional discussion of the techniques and language content described here. An additional resource is a Reading Program Advisory available from the California Department of Education (1-800-995-4099) entitled *Teaching Reading: A Balanced, Comprehensive Approach to Teaching Reading in PreKindergarten Through Grade Three.*

[42]e.g., Calfee, Chambliss, & Beretz, 1991.

[43]e.g., Ehri, 1994; Gough, 1996; Share & Stanovich, 1995.

[44]Moats, 1994; Moats & Lyon, 1996; Scarborough, Ehri, Olson, & Fowler, in press.

[45]Moats, 1995.

[46]The rationale is explicated in Henry (1988) and in her instructional program, *Words* (1990).

[47]See Stanovich (1986) for a discussion of the principle of converging evidence.

[48]The International Multisensory Structured Language Education Council (IMSLEC), a consortium of programs established to treat reading, language, and writing problems, has recently developed accreditation standards for programs or organizations that uphold specified standards for training structured language teachers and therapists.

[49]e.g., Lindamood, 1994.

[50]See Fish & Margolis (1988) for a discussion of the lack of training on reading development and reading disability for school psychologists. In recognition of the importance of school psychologists being better informed about reading disability, a recent volume of the *School Psychology Review* (volume XXIV, No. 3, 1995) was devoted to presenting current research findings in the field of reading.

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